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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE BOARD OF APPEALS AND PATENT INTERFERENCES

In re: Application of Philip Von Schroeter *et al.*	Art Unit: 2628
Serial No. 10/564,161	Examiner: Tize Ma
Filed: January 11, 2006	
For: **METHOD FOR REPRESENTING A DENTAL OBJECT AND FOR PRODUCING DENTURES**	

APPELLANTS' BRIEF ON APPEAL

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I. REAL PARTY IN INTEREST

The real party in interest is DeguDent GmbH, a German company, the assignee of the inventors .

II. RELATED APPEALS AND INTERFERENCES

None

III. STATUS OF CLAIMS

Claims 1, 6, 7, 12-14, 16-18, 21, 23-25, have been cancelled.

Claims 2-5, 8-11,15, 19, 20, 22, and 26-34 have been rejected. The rejected claims are the subject of this appeal.

IV. STATUS OF AMENDMENTS

An Amendment filed on October 5, 2009 after a final rejection has been entered in an Advisory Action dated November 9, 2009.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Claims 34 and 19 are the only independent claims subject to this Appeal. The remaining claims on appeal are dependent on either claim 34 or claim 19. For the sake of simplicity reference hereinafter to a dental prosthesis will be used, although the specification refers to a "dental object" and it

will be understood that this encompasses all such objects noted in the application.

Claim 34 is a very specific Jeppson style claim drawn to a method for the display of a digitized dental prosthesis or the like (14, 18, or 46) on a computer monitor or screen. A coordinate system X, Y, and Z (Fig. 7) is utilized wherein the Z and Y axes are in the image plane of the monitor and the dental prosthesis is rotated about two axes running parallel to each other and is shifted along the X axis for zooming. See page 4, lines 22 through 5, line 9.

The Jeppson improvement in this parent claim consists of the fact that the prosthesis is aligned along a T-axis (20) which runs in a plane defined by the X-axis (24) and the Y-axis (25) and is moved to a maximum of five degrees of freedom (page 10, lines 7-12). The first degree of freedom is rotation about the Z axis (page 3, lines 10 and 11), rotation about the T axis is the second degree of freedom (page 3, line 11), translation along the T axis represents the third degree of freedom (page 3, lines 12 and 13). The fourth degree of freedom is the translation of the prosthesis along the X axis.

When viewed on the monitor, the longitudinal axis of the prosthesis is formed by connecting straight lines through a transverse polygon (see page 4, lines 3-8) for shifting the prosthesis along the T axis and the prosthesis is shifted

along a straight line of the polygon which passes through the point of origin (28) of the XYZ coordinate system.

In the claimed method, the prosthesis is shifted along the first and second straight lines which forms an angle β where β≠180°. The prosthesis is rotated about the angle β about the Z axis after shifting along the first straight line and before shifting along the second straight line.

Claim 2 (dependent upon claim 34) specifies that the prosthesis is moved to a maximum of the first, second, third, and fourth degrees of freedom.

Claim 15 (dependent upon Claim 2) recites an adjusting wheel 12 (Figure 1)as one of several inputs.

Claim 3 (dependent upon Claim 34) adds a fifth degree of freedom.(see page 3, lines 17-20) by rotation of the prosthesis about the X axis.

Claim 4 (dependent upon Claim 34) adds that the prosthesis is rotated at an angle about the T-axis of less than 360° and preferably less than or equal to 180°. (page 3, lines 21-24)

Claim 5 (dependent upon Claim 34) indicates that the display of the prosthesis on the monitor screen is independent of its movement and is passed through by the point of origin of the coordinate system. (page 5, lines 4,5)

Claim 8 (dependent upon Claim 34) includes a reduced translation of the prosthesis along the T-axis.(see page 8, lines 13-19)

Claim 9 (dependent upon Claim 34) recites that the coordinate system appears on the monitor in a defined fixed position regardless of the movement of the prosthesis. (page 11, lines 9,10)

Claim 10 (dependent upon Claim 34) The coordinate system is located in the center of the monitor. See page 11, lines 18-20 (Figs. 7-10).

Claim 11 (dependent upon Claim 34) The rotation about the T-axis is obtained by pivoting the prosthesis to and fro. (page 15, lines 17-23)

Claim 26 (dependent upon Claim 34) This claim includes an input device (1,2,3) used to align the prosthesis on the monitor screen and has elements (Fig. 1) for alignment independently of each of the degrees of freedom.

Claim 27 (dependent upon Claim 26) Specifies four input elements. Figs. 1-3. See page 6, lines 13,14.

Claim 28 (dependent upon Claim 26) One of the input elements is a changeover switch (page 6, lines 13,14)

Claim 29(dependent upon Claim 26) Specifies that the input device is a trackball that serves for two of the input elements. See page 6, lines 16,17; page 7, lines 3-5.

Claim 30 (dependent upon Claim 29) The trackball by analogous rotation serves to rotate the prosthesis about the first and second axes. (page 7, lines 3-5)

Claim 31 (dependent upon Claim 26) In this claim the prosthesis is moved in a restricted manner by individual input elements and the combined operation of two input elements around four degrees of freedom. Page 8, lines 1-9; page 10, lines 7-12.

Independent Claim 19 This claim is directed to a method for manufacturing a dental prosthesis based upon digitized data of the patient's jaw area. The displayed data is presented on a monitor screen and evaluated by moving the prosthesis on the monitor up to five degrees of freedom, modifying the displayed prosthesis and using the data displayed to manufacture the prosthesis. See page 1, lines 3-11.

Claim 20 (dependent upon Claim 19) States that the jaw area and the prosthesis are displayed on the monitor. Page 4, lines 22-25.

Claim 22 (dependent upon Claim 19) Here the displayed prosthesis is modeled by electronic modification of the data. Note page 16, lines 12-17.

Claim 32 (dependent upon Claim 20) In this claim, the digitized data of the jaw area is linked with stored

parameters such as wall thickness of the prosthesis or the cement gap between the prosthesis and the jaw. From this data, the prosthesis is computed and displayed on the monitor screen. This is discussed on page 5, lines 21-23.

Claim 33 (dependant upon Claim 19) The prosthesis and/or jaw area are moved on the monitor to a maximum of four degrees of movement. See page 4, lines 15-17.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 2-5, 8-11, 26-28, 31 and 34 are unpatentable under 35 U.S.C. §103(a) over Shibata *et al.* (U.S. 6,466,831) in view of Kopelman *et al.* (U.S. 6,664,986).

2. Whether claims 15 and 29-30 are unpatentable under 35 U.S.C. §103(a) over Shibata *et al.* (U.S. 6,466,831) in view of Kopelman *et al.* (U.S. 6,664,986) and in further view of Wang (U.S. Pub. 2002/0060663).

3. Whether claims 19, 20, 22, 32 and 33 are unpatentable under 35 U.S.C. §103(a) over Kopelman *et al.* (U.S. 6,664,986)in view of Rubbert *et al.* (U.S. Pub. 2002/0010568) and in further view of Shibata *et al.* (U.S. 6,466,831).

VII. ARGUMENTS

The Examiner has pieced together various details from two or three different prior art disclosures in order to tailor a rejection based upon obviousness (35 U.S.C. 103(a)). In none of these citations is there any suggestion or impetus for such combination of teachings.

It has long been held that obviousness cannot be established or predicated by combining teachings of prior art to produce the claimed invention, absent some teaching or suggestion supporting such combination. See *ACS-Hospital Systems, Inc. v. Montefiore Hospital et al.* 221 USPQ 929(Fed. Cir. 1984. Also note *Ex parte Willems* 84 USPQ2d 1350 (Bd. Pat. App. & Int. 2006)

1. First ground of rejection Shibata *et al.* (U.S. 6,466,831) has been cited by the Examiner to show a method for displaying a digitized object on a monitor using an X-Y-Z coordinate system. The system makes no mention of use in a dental environment. The arrangement relates to the art of technical 3D-CAD systems. The patent is silent with regard to restriction of the display of the object such that it can be moved to a maximum of five degrees of freedom as provided by the present invention.

Parent claim 34 defines the degrees of freedom clearly, namely a rotation about the Z-axis, a translation along the X-axis, and a translation and rotation about an additional T-axis running in the X/Y plane and originating from the point of origin of the coordinate system. The dental prosthesis or object is displayed aligned along the T-axis. Such arrangement is not suggested by Shibata.

It is not possible with Shibata to have a movement to a maximum of five degrees of freedom nor is an additional axis provided relative to which the object is aligned.

The representation of a dental object is in fact shown by Kopelman *et al.* (U.S. 6,664,986). This patent discloses a computer interface for use in the orthodontic field. No suggestion can be found in this patent for aligning the prosthesis or object along an axis running in a plane defined by both X and Y axes. Rotation and movement about and along the T-axis is not anticipated by Kopelman *et al.*

According to Kopelman *et al.* (column 3, lines 4 *et seq.*, a series of steps are suggested relating to the graphic user interface, however, neither a T-axis nor a polygon line are used for displaying an elongated dental object and shifting the same.

The Examiner has made certain general comments when there is no teaching in the prior art, such as "an obvious variance", "they are all up to the choices of the users" and "the degree of freedom is considered as an obvious variance". No comment is made as to why these claimed elements or steps are obvious.

2. Second ground of rejection This rejection relies on the prior art noted immediately above taken in further view of Wang. This last patent is relied upon for the teaching of a computer input device such as a mouse having an adjusting wheel and trackball for direct manipulation of three-dimensional objects. Applicants are not claiming such an input device *per se*, which admittedly is old, but rather in combination with the additional elements set forth in parent Claim 34 and other claims dependent therefrom.

3. Third ground of rejection This ground of rejection relates to the claims directed to a method for manufacturing dental prostheses and wherein Claim 19 is the parent claim from which the remainder depend. The Examiner has rejected these claims as unpatentable over the combination of three references Kopelman *et al.* in view of Rubbert *et al.* and in further view of Shibata *et al.*

These claims require that the digitized data for a dental object (prosthesis) is displayed on a monitor and is moved on the monitor to a maximum of five degrees of freedom. There is no support for the rejection and comment that the "five degrees of freedom" recitation is "an obvious variance".

As previously noted, Shibata *et al.* is not concerned with a method of displaying an object on a monitor screen, but rather to a three-dimensional data input device. This is a typical of the state of the art and fails to show any relationship to the dental arts or technology nor does it have any regard for the restriction of the display of the object such that the same can be moved to a maximum of five degrees of freedom.

Kopelman provides no suggestion that a dental object or prosthesis can be manufactured on the basis of the object that is digitized and displayed on the monitor.

Conclusion:

Based on the arguments presented above, reversal of all rejections of record is respectfully solicired.

Respectfully submitted,

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CLAIMS APPENDIX

The appealed claims are as follows:

Claim 34. A method for displaying a digitized dental technical object, such as a dental prosthesis or a model of at least one tooth or of an area of the jaw to be provided with a dental prosthesis on a monitor, utilizing a right-angled coordinate system with X, Y and Z axes, whereby the Z-axis and the Y-axis and the intersection, or origin of the coordinate system, of the axes run in the image plane of the monitor and the X -axis runs perpendicular to the image plane and the dental technical object is rotated about two axes running perpendicular to each other and is shifted along the X-axis for zooming the object;

the improvement comprising, the dental technical object is aligned along a T-axis running in a plane defined by the X-axis and the Y-axis and passing through the origin of the coordinate system and is moved to a maximum of five degrees of freedom, whereby a rotation (Rot_z)about the Z-axis is chosen as the first degree of freedom, a rotation (Rot_t) about the T-axis is chosen as the second degree of freedom, a translation of the object along the T-axis is chosen as the third degree of freedom and the

translation of the object along the X-axis is chosen as the fourth degree of freedom, and

a longitudinal axis of the dental technical object is formed by a traverse polygon with straight lines connecting sections of said dental technical object, for shifting the said dental technical object along the T-axis, the object is shifted along a straight line of the traverse polygon which passes through the origin of the coordinate system, and

for shifting the dental technical object along consecutive first and second straight lines forming an angle β which is $\neq 180°$, the object is rotated about the angle β about the z-axis after completion of the shifting along the first straight line before shifting the dental technical object along the second straight line.

Claim 2. A method according to claim 34, wherein the technical dental object is moved to a maximum of the first, second, third and fourth degrees of freedom.

Claim 15. A method according to claim 2, wherein an adjusting wheel is used as one or several input elements.

Claim 3. A method according to claim 34, wherein a fifth degree of freedom, a rotation (Rot_x) of the object around the X-axis is chosen.

Claim 4. A method according to claim 34, wherein the technical dental object is rotated at an angle α about the T-axis, and wherein $\alpha < 360°$, and preferably $\leq 180°$.

Claim 5. A method according to claim 34 wherein the technical dental object is displayed on the monitor in such a way that the technical dental object is independent of its movement or presentation is passed through by the origin of the

the

coordinate system.

Claim 8. A method according to claim 34, wherein in that a reduced translation of the object along the T-axis is carried out.

Claim 9. A method according to claim 34, wherein the coordinate system with its origin is specified on the monitor in such a way that the origin remains in_defined position on the monitor independent of the movement of the object.

Claim 10. A method according to claim 34, wherein the coordinate origin is placed approximately in the center of the monitor.

11. A method according to claim 34, wherein the reduced rotation about the T-axis (second degree of freedom) is realized by pivoting the object to and fro.

Claim 26. A method according to claim 34, wherein an input device is employed for aligning the object on the monitor, said devise having input elements by which the alignment of the object is carried out at the respective degrees of freedom independently of each other.

Claim 27. A method according to claim 26 wherein said input devise has four input elements.

Claim 28. A method according to claim 26 wherein a changeover switch is used for one of said input elements.

Claim 29. A method according to claim 26 wherein said input device is a trackball that functions for at least two of said input elements.

Claim 30. A method according to claim 29 wherein, when said trackball is used as one of the input elements, the dental technical object is rotated about the first and second axes as well as about an axis running perpendicular to this axis by analogous rotation of the trackball.

Claim 31. A method according to claim 26 wherein the dental technical object is moved in a restricted manner by the optional operation of individual input elements as well as the combined operation of two input elements around four degrees of freedom.

Claim 19. A method for manufacturing dental prostheses on the basis of digitized data of a jaw area to be provided with the dental prosthesis, computing the dental prosthesis based on the digitized data and displaying at least the dental prosthesis on a monitor, evaluating the displayed dental prosthesis by moving the dental prosthesis on the monitor to a maximum of five degrees of freedom, and, if necessary, modifying the displayed dental prosthesis and the subsequent manufacture of the dental prosthesis on the basis of the data that correspond to the displayed dental prosthesis.

Claim 20. A method according to claim 19, wherein the dental prosthesis and the jaw area to be provided with the dental prosthesis are displayed on the monitor.

Claim 22. A method according to claim 19, wherein the dental prosthesis displayed on the monitor is modeled by electronic modification of the data.

Claim 32. A method according to claim 20, wherein the digitized data of the jaw area to be provided with the dental prosthesis, that is taken as a basis for computing the dental prosthesis, is linked with stored parameters such as wall thickness of the dental prosthesis or the cement gap between the dental prosthesis and the jaw area and that from data so attained, the dental prosthesis is computed and displayed on the monitor.

Claim 33. (previously presented) A method according to claim 19, wherein the dental prosthesis and/or jaw area are moved on the monitor to a maximum of four degrees of freedom.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None